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FIVE NEW RECORDS AND NOTES ON CANADIAN ACRIDIDAE FROM THE HIGDON RANCH, SOUTHEASTERN ALBERTA

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For a number of years the writer has awaited an opportunity to collect in the southeastern corner of Alberta with the expectation of finding there certain Acridids not previously recorded from Canada. That opportunity came on July 16, 1938, when the writer, accompanied by his brother, went into the Higdon Ranch, via Warner, Foremost, Orion and Manyberries and again on September 14, went into the same ranch via Havre, Wild Horse and Comrey.

The Higdon Ranch, called the Bar-N-Bar, of some 135,000 acres, lies about 37 miles southwest of Manyberries and immediately southwest of Comrey and approximately eight miles north of the International Boundary. The deep, broad valley of the Milk river cuts across the ranch. The fact that the Milk river has its source in northwestern Montana and after entering southeastern Alberta again flows into Montana and the Missouri river valley, favors the surmise that certain Montana acridids, not as yet known from Alberta or from Canada, may be found there. This supposition proved correct, for on September 15, in one and one half hours of collecting time, the writer took *four* new Canadian records, one Alberta record, as well as a number of other rare and interesting forms.

It is the purpose of this paper to present notes on those acridids taken at that time. It is interesting to observe that the total collecting time for the two days, July 17 and Sept. 15, did not exceed three hours. Undoubtedly other new records will be taken in southeastern Alberta, as time unfortunately did not permit an extensive survey. However it is believed that that number will not exceed three or four. It is hoped that the material offered in this manuscript will prove of value to students in defining the limits of the Upper Sonora or Austral Zone in the southeastern corner of Alberta. Specimens of the new Canadian records and other acridids have been presented to the Canadian National Collection.

NEW CANADIAN RECORDS

Opeia obscura (Thomas). 2 ♂, 1 ♀, Sept. 15, 1938. This interesting species was taken on the upper edge of the north rim of the valley about one mile north-west of the Higdon Ranch house. It was of rare occurrence in the prairie grass where the plains met the valley. No specimens were found north of the rim of the Milk river valley. In 1928 Hebard in his Montana paper stated that the species was not known north of Glendive and Helena in Montana and that Bruner's record from the plains of Saskatchewan was to be strongly questioned. Later in his "Notes on Montana Orthoptera" Hebard (1932) extended its known range north to Havre, Harlem and Nashua, so that its presence in southeastern Alberta was to be expected.

Drepanopterna femoratum (Scudder). One newly emerged male was taken July 17 on the grassland in the valley at the base of the north valley slopes and two males were captured September 15 in the same general location. The males are very active and possess great saltatorial powers. Although searched for, not a sign of a female nymph or adult was seen. On the Higdon Ranch this species is one of the rarest acridids. In 1928 its northern known limit of

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distribution was the Marias River not far from the Alberta boundary and in 1932 Hebard gave Havre and Brockton as additional points. Its discovery in Alberta was to be expected, but it is doubtful whether it will ever be found north of the Milk river valley.

Derotmema haydenii haydenii (Thomas). The finding of *Derotmema* in Alberta was a decided surprise to the writer, for its presence there was totally unexpected. Nor was it one that Hebard had anticipated to be found there in his Alberta paper of 1930. Its previously known distribution, in 1928, appeared to be the Yellowstone valley from Livingston to Glendive with Lewistown, about central in the state, its northermost limital point. However additional records appeared in 1932 when Hebard reported it from Havre, Shelby and Box Elder, Montana. One male and five females were taken September 15 on bare gravelly-clayey soil at the base of the north valley slopes where the water running down the valley slopes during rains had cut up the floor into a number of small stream beds. One male was taken at the north gate of the Higdon Ranch, eight miles north of the valley, so that the species is not entirely restricted to the hot valley floor of the Milk river. Collections made north of that point to Etsicom, twenty miles north, did not reveal the species. It is doubtful whether *Derotmema* will ever be found more than a few miles north of the Milk river valley.

Trimerotropis laticincta Saussure. 2 ♂, Sept. 15, on north rim of valley in prairie grass. *Arphia pseudonietana* (Thomas), *Trimerotropis campestris* McNeill and *Aulocara elliotti* (Thomas) were common species in this habitat. The discovery of this species was anticipated as Hebard, in 1930, reported it from "as far north as the Sunshine Road crossing of the Marias River, not far distant from the boundary of Alberta." This species will probably never be found more than a short distance north of the Milk river valley in Alberta.

Melanoplus confusus Scudder. 1 ♀, July 17. This is the first record of this species from Alberta although the species has been reported from British Columbia and from Rudy, Saskatchewan. It is quite difficult to distinguish the various females of certain species of *Melanoplus*, especially those that are of similar size. *M. confusus* cannot be confused with the larger *bivittatus* or *packardi* or the gray sage loving *bowditchi canus* or the smaller *infantilis*. Other species such as *mexicanus, gladstoni* and *occidentalis* are with increasing difficulty separated. *Gladstoni* is a much more mottled species usually with suffusions of gray on the metazona of the pronotum and with the fasciations of the caudal femora more strikingly marked. Females of *mexicanus* from the same locality have a longer pronotum, longer tegmina, and lack the solid post ocular band observed in *confusus*. Females of *occidentalis* from Alberta are very close to *confusus*, but the postocular band is not solid black, the caudal tibiae are a deeper glaucous, and certain features of the pronotum serve to distinguish the two. *Confusus* can be recognized by its medium small size, solid black postocular band on the head, prozona of the pronotum, mesepimeron and metepimeron of of the thoracic pleurites, and the pale glaucous tibiae. In addition there are other observable features when the females of the various species are compared side by side. The species inhabits the grasslands of the prairies and is a spring appearing form.

A complete list with notes on all the species of Acrididae taken at the Higdon Ranch follows. These are presented in their usual taxonomic arrangement. The collections were made in the following types of habitats: July 17: pasture land in valley floor overgrown with willows and buckbrush and, in places, some tall sage; prairie in valley floor; east clayey slope of a coulee or draw coming into the main valley from the north. September 15: prairie land on upper edge of valley slopes; grassy and clayey south facing slopes of the north side of the valley; clayey valley floor with sparse patches of short grass.

ACRIDIDAE

Amphitornus coloradus (Thomas). 4 ♂, 1 ♀, Sept. 15. This species is not abundant on the grasslands of southern Alberta.

Phlibostroma quadrimaculata (Thomas). 3 ♂, 6 ♀, Sept. 15. This is a fairly common species on the prairies of southern Alberta.

Opeia obscura (Thomas). Already reported above for the first time from Canada. This species at the Higdon Ranch seemed to prefer tall grass on the upper edge of the north valley slope, and there it was very rare.

Chloealtis conspersa Harris. 1 ♂, 2 ♀, 1 ♂ 5th stadium nymph, July 17. The habitat of this species at the Higdon Ranch was tall grass amongst buckbrush in the pasture land on the valley floor.

Chortippus longicornis (Latreille). 1 ♂, 1 ♀, July 17; pasture land of valley floor associated with *Chloealtis conspersa*. Hebard (1936) synonymized *Chortippus curtipennis*, a long established name, under the European *C. longicornis*, thus making the species Holarctic in distribution.

Cordillacris occipitalis cinerea (Bruner). 1 ♂, Sept. 15. The habitat of this rare species at the Higdon Ranch was tall grass at the upper rim of the north valley slope.

Aeropedellus clavatus (Thomas). 1 ♀, July 17. In 1932 Bei-Bienko, a Russian Orthopterist, erected the genus *Aeropedellus* to include part of the genus *Gomphocerus* in which *clavatus* was formely placed. *Aeropedellus* is Holoarctic in distribution but *clavatus* is a Nearctic species. *A. clavatus* is a fairly common form in the early summer on the plains of southern Alberta, but the adults are not commonly taken after July.

Bruneria brunnea (Thomas). 2 ♂, Sept. 15. This species is one of the less common species on the prairies of southern Alberta. It is a summer form preferring mountain grasslands, and in Alberta becomes more abundant in the foothill regions.

Ageneotettix deorum deorum (Scudder). 2 ♂, 7 ♀, Sept. 15. This summer species is a fairly common inhabitant of the grasslands of southern Alberta.

Psoloessa delicatula delicatula (Scudder). 1 ♂, July 17; 3 small 4th stadium nymphs, Sept. 15. This prairie species is a spring form that hibernates through the winter in the fourth or fifth nymphal instars, and shortly after the disappearance of the snow it becomes adult sometime in May. The ova are laid in June, and the young hoppers appearing in early summer are well matured by fall. This is not a common species in southern Alberta.

Drepanopterna femoratum (Scudder). Recorded above for the first time from Canada and already discussed. This species, originally described as an *Aulocara*, was removed to the new genus *Drepanopterna* erected for it by Rehn in 1927. The species matures in mid July and lives through until the end of September.

Aulocara elliotti Thomas. 3 ♂, 2 ♀, July 17; 3 ♂, 7 ♀, Sept. 15. This species matures in early July and on the grasslands of southern Alberta is one of the commonest forms.

Arphia pseudonietana pseudonietana (Thomas). 3 ♂, 5 ♀, Sept. 15. This beautiful red-winged species is quite abundant on the grasslands of southern Alberta. At the Higdon Ranch it was very common in the prairie grass on the upper rim of the north valley slope.

Encoptolophus sordidus costalis (Scudder). 1 ♂, Sept. 15. In 1934 Hebard assigned *costalis* to racial status under *sordidus*. This species is not common in Alberta where it is known as far north as Edmonton.

Camnula pellucida (Scudder). The single female captured July 17 was taken in the pasture lands of the valley. It is a widely distributed species in western North America, often becoming an important range species.

Dissosteira carolina (Linnaeus). 1 ♀, 5th stadium nymph, July 17. This handsome species is fairly common along roads and railroad right-of-ways in Southern Alberta.

Derotmema haydenii haydenii (Thomas). Already reported above for the first time from Canada.

Trachyrhachis kiowa kiowa (Thomas). 1 ♀, July 17; 4 ♂, 1 ♀, Sept. 15. This is a common species in southern Alberta.

Metator pardalinus (Saussure). 2 ♀, July 17; 1 ♀, Sept. 15. *M. pardalinus* is an inhabitant of the northern grasslands and in the summer quite a common species in southern Alberta.

Trimerotropis sparsa (Thomas). 2 ♂, Sept. 15. Specimens of this species, collected by the writer in the badlands at Morrin and Drumheller in 1927, were recorded by Hebard in his Montana paper (1928) as the first Canadian records. At the Higdon Ranch this species inhabited the south-facing clayey slopes of the north side of the valley. The specimens taken were well worn.

Trimerotropis pallidipennis salina McNeill. 2 ♂, 1 ♀, July 17. This is one of the rarer species of *Trimerotropis* in southern Alberta, although in the deserts of the southwest this is the most ubiquitous of species. A specimen collected at Edmonton in 1925 by the writer constitutes the northernmost distributional point in the range of this species.

Trimerotropis campestris McNeill. 6 ♂, 2 ♀, Sept. 15. This is probably the commonest of the species of *Trimerotropis* on the plains of southern Alberta. At the Higdon Ranch it was fairly common in the tall prairie grass on the north rim of the valley.

Trimerotropis pistrinaria Saussure. 2 ♂, 6 ♀, Sept. 15. This species prefers gravelly ridges for its habitat and, where these occur, can usually be found in southern Alberta. At the Higdon Ranch, *pistrinaria* inhabited the more exposed portions of the upper rim of the north valley slopes. Until 1931 this species was known as the synonymous *T. bruneri.*

Trimerotropis laticincta Saussure. This species has already been recorded above for the first time from Canada. At the Higdon Ranch it was an uncommon inhabitant of the tall grass on the north rim of the Milk river Valley.

Hadrotettix trifasciatus (Say). 2 ♀, Sept. 15. The writer searched especially for this species in July but none were found in southern Alberta at various localities although nymphs were found near Sunburst, Montana, July 16, a locality a few miles south of Coutts. At the Higdon Ranch the species was located on the crest of the north valley slopes in the tall grass and at this time was badly worn with age. This species was previously known only from Calgary and Medicine Hat.

Circotettix rabula rabula Rehn and Hebard. 5 ♂, 2 ♀, July 17; 1 ♂, 2 ♀, Sept. 15. In July this loud crackling species was common on the clayey, fossiliferous slopes of a coulee or draw about one-half mile north of the Higdon Ranch House. This species prefers clayey and gravelly slopes of valley, hogbacks and badlands as its habitat in Alberta.

Aerochoreutes carlinianus carlinianus (Thomas). 2 ♂, July 17; 1 ♂, Sept. 15. This black-winged, powerful flyer of the northwest can be heard for long distances. Its generic name, meaning "Choral Dancer of the Air", is most appropriate, for it will often remain in the air dancing on the ether waves for many minutes at a time. When disturbed after settling to the ground, it flies rapidly into the air with a startling buzzing whir and once in the air proceeds with a long undulating flight and loud rippling crackles of its wings. In mid summer this interesting species is common in southern Alberta, often sporting over fields of summer fallow. At the Higdon Ranch the habitat of this species was the same as that of *Circotettix.*

Schistocerca lineata Scudder. 3 ♂, 1 ♀, Sept. 15; others seen. This interesting and rare species in Alberta was quite common in the tall grass on the upper half of the south facing slopes of the north side of the valley. Like other species of *Schistocera* in North America, the flight is low and sustained, ending abruptly by a rapid dive into some clump of bushes or into the tall grass. Though common at the Higdon Ranch in its proper habitat, only four specimens of this wary species were captured with considerable difficulty on the steep slopes of the valley. The only other locality where the species has been taken in Alberta is Medicine Hat.

Aeoloplus turnbulli turnbulli (Thomas). 6 ♂, 8 ♀; 1 ♀ (teneral); 3 ♀ nymphs, last instar, July 17; 1 ♂, 7 ♀, (worn), Sept. 15. Hebard in 1930 recorded this species for the first time for Canada from Cypress and Minda, Alberta. At the Higdon Ranch, July 17, the adults were newly emerged, and there were still many grayish green nymphs present. Some of these were cared for and matured in several days. This species was found breeding on Russian Thistle, *Salsola pestifer*, which appeared to be its only food plant. Whether this species gives any measure of control for this serious weed pest is not known. If fairly abundant, it is possible that this interesting acridid can check and keep reduced stunted Russian thistle plants growing on hard uncultivated soil.

Hesperotettix viridis pratensis (Scudder). 3 ♀, Sept. 15, on sage. Specimens taken by the author at Lethbridge, July 11, 1926, were recorded by Hebard in his Montana paper as the first Canadian record. . In 1930 Hebard reported it from Lethbridge and Ft. MacLeod. This is a rare species in Alberta where it is always found associated with its host plant, sage.

Melanoplus bivittatus (Say). 1 ♂, 2 ♀, July 17. This is a common species in the southern half of Alberta and appears to be always associated with buckbrush. At the Higdon Ranch it was found in buckbrush in the pasture lands of the valley.

Melanoplus gladstoni Scudder. 1 ♂, 2 ♀, Sept. 15. This species is fairly common on the prairies of southern Alberta. It can be distinguished by its mottled dark and light gray appearance and by its red hind tibiae.

Melanoplus confusus Scudder. This species has already been discussed and reported above for the first time from Alberta.

Melanoplus infantilis Scudder. 3 ♂, 1 ♀, July 17; 2 ♂, 1 ♀, Sept. 15. This small *Melanoplus* is fairly common in southern Alberta.

Melanoplus occidentalis occidentalis (Thomas). 2 ♀, July 17. This early summer species is not common on the grasslands of southern Alberta. The females closely resemble those of *M. confusus*.

Melanoplus mexicanus mexicanus (Saussure). 4 ♂, 4 ♀, July 17; 5 ♂, 4 ♀, Sept. 15. This is one of the commonest and most destructive species on the North American continent.

Melanoplus packardi Scudder. 3 ♂, July 17; 1 ♂, 4 ♀, Sept. 15. This larger species is fairly common in southern Alberta. Resemblance to *M. foedus* Scudder is so close that the species cannot be distinguished except by study of the male internal genitalia.

Melanoplus bowditchi canus Hebard. 2 ♂ (teneral), July 17; 1 ♀ (worn), Sept. 15. This sage loving species has been reported only from Medicine Hat and Lethbridge. Hebard failed to record in his Alberta paper specimens taken by the writer in the badlands at Morrin on Sept. 21, 1927, and which he stated in litt. were the first from Canada. Morrin is also the northernmost distributional point in the range of this subspecies.

Photaliotes nebrascensis (Thomas). 2 ♂, 4 ♀, Sept. 15. This is a fairly common species on the grasslands of southeastern Alberta.

SUMMARY AND CONCLUSION

Two hundred and five specimens representing twenty-eight genera and thirty-nine species have been studied and reported upon, including four new Canadian records and one new Alberta record. It is interesting to note that there are thirty-eight genera of Albertan Acrididae of which twenty-eight represents seventy-four per cent. Other prairie genera not taken but undoubtedly occurring at the Higdon Ranch are: *Acrolophitus; Chortophaga, Cratypedes, Xanthippus* and *Spharagemon.* Of all the Alberta genera, only *Chrysochroan, Stethophyma* and *Asemoplus* could not possibly occur there. In other words over ninety per cent of the Acrididae of Alberta could be taken at Higdon Ranch if thorough collecting was continued throughout the entire season.

There is a possibility that *Orphulella pelidna* (Burmeister), *Eritettix tricarinatus* (Thomas) and *Melanoplus angustipennis* (Dodge) will eventually be found in southeastern Alberta and a remoter one of finding there the black *Boopedon nubilum* (Say), *Mermiria maculipennis macclungi* Rehn and the beautiful *Dactylotum pictum* (Thomas), all three of which were recorded by Hebard in 1932 from various localities along the Missouri and Milk Rivers in northeastern Montana. Perhaps the mantid *Litaneutria minor* Scudder which has been reported from Havre also occurs in Alberta.

The new records bring the total of Albertan Acrididae to seventy-two species and a grand total of eighty-eight species of Orthoptera from the province.

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HYDATICUS MODESTUS SHARP VERSUS HYDATICUS STAGNALIS FAB. IN NORTH AMERICA (COLEOPTERA, DYTISCIDAE)

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For many years I have felt reasonably certain that the North American species of *Hydaticus* identified as *stagnalis* Fab. was not that species, and I have become entirely convinced on this point since I have had the opportunity of a critical examination of a series of the true *stagnalis* kindly sent to me by the late Dr. Alois Zimmerman of Munich.

The male sexual characters are much alike but the following differences in the two species seem to be constant:

(1) Our species is evidently narrower in proportion to its width and more parallel than *stagnalis.*

(2) Our species in the male is usually entirely without the longitudinal elytral vittae which seem to be very conspicuous on males of *stagnalis.* Of forty-four North American males now before me, none shows more than a trace of vittae, and almost all show absolutely none, while all my males of *stagnalis* have the vittae at least as evident, if not more evident than in my females of that species. On the other hand the females of the North American species may range from very markedly vittate to entirely non-vittate. That these vittate and non- vittate males and females are of the same species is certain, as I have frequently taken them *in coitu.*

(3) The hind claws of male North American specimens differ from those of *stagnalis* males by the outer claw being proportionately shorter and weaker than the inner.

(4) The apices of the elytra of our North American species are strongly sinuate in the female: those of *stagnalis* females, judging from my specimens, are not, nor have I found any evidence in the literature that they are.

In the examination of very many specimens coming from the Atlantic to the Pacific purporting to be *stagnalis,* none of that species has been found, and I am of the opinion that both it and *laevipennis* Thomson,—said to be a variety of *stagnalis* by Zimmermann, and a good European species by Guignot—should be taken off our lists.

Having established to my own satisfaction that our species was not *stagnalis* it became necessary to find a name for it. Dr. Horn, and later Dr. Zimmermann regarded *modestus* and *americanus* of Sharp as synonyms or at most varieties of *stagnalis.* In his remarks under *modestus* (Trans. Roy. Soc. Dublin, 1882, p. 650), Dr. Sharp states that *modestus,* of which he had only a male, is very similar to *americanus,* of which he had only a female, but is readily distinguished by the absence of yellow vittae on the wing cases. *But this is exactly the difference between the male and female of our local species.* Further (Op. cit. p. 651), he says that *americanus* is closely allied to *stagnalis* but is of a narrower and more parallel form, with the yellow lines and fascia of the elytra more distinct, and the elytral apices produced. But, again, these are the ways in which the female of our species usually differs from the female of *stagnalis.* Dr. Zimmermann (Die Schwimmkäfer des Dtsch. Entom. Mus. p. 225) says that *americanus* differs from *stagnalis* chiefly in the sexual sculpture being totally absent. This is not correct, as in our local species the majority of the females are sculptured, some very strongly so, though some specimens are as smooth as are the males. This difference of sculpture is not correlated with the presence or absence of vittae. Now as mentioned above, Dr. Sharp had only a male of *modestus* and a female of *americanus,* and his descriptions and a careful comparison of my specimens with these descriptions convince me that *americanus* is the female of *modestus* and that the two specimens described by Dr. Sharp represent our species, his statements mentioned above apparently settling the matter.

While I have seen a number of specimens labelled *cinctipennis* Aubé, each on examination proved to be the same as our local species. Dr. Sharp's description of *cinctipennis* (op. cit. p. 651) was drawn from a single male in very mutilated condition, and apparently the specimen differs from *modestus* chiefly in two ways: (1) the basal patch of dense rough setae on the middle tarsus in *cinctipennis* is rather small though distinct while in *modestus* it is very large and conspicuous, (2) the colour of the upper surface of *cinctipennis* is less variegated than in *modestus.* Just what weight as a specific character should be given to the size of the patch of setae on the middle tarsus I am not sure, but judging from my long series of *modestus* it is not of much importance, as considerable variation is shown. As to colour, *cinctipennis* seems to lack the bimaculate black ornamentation of the vertex, the base of the pronotum is not black but vaguely infuscate, and the elytral sub-basal transverse bar is absent. Dr. Zimmermann (Die Schwimmkäfer des Dtsch. Entom. Mus., p. 225) thinks that *cinctipennis* is a good species, basing his opinion on the different pronotal coloration. I do not know if Dr. Zimmermann has seen either Aubé's type or a series of specimens showing this vaguely infuscate pronotal base, but no specimen that I have seen agrees on this point with the description of *cinctipennis.* The lack of maculation of the head may well, too, be specific, but I attach little importance to the absence of the subbasal elytral cross bar. On the whole, while I feel much inclined to regard *modestus* and *americanus* as the same as *cinctipennis,* it may be well to wait until opportunity arises for a study of much material from the eastern portion of North America before thus disposing of the matter. In the meantime we may consider *cinctipennis* and *modestus* as good species distinct from *stagnalis,* with *americanus* as a synonym of *modestus* which has page priority.

THE GENUS GRAPHODERUS AUBE IN NORTH AMERICA (NORTH OF MEXICO) (COLEOPTERA)

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As it may not have come to the notice of all American coleopterists, may I first point out that the correct spelling of the name for the Dytiscid genus long known as *Graphoderes* Thomson should be *Graphoderus,* and its authorship should be accredited to Aubé. The above changes should be credited to Dr. F. Guignot of Avignon, France, who in his magnificent work "Hydrocanthares de France", (Ouvrage couronné par la Société Entomologique de France), 1931-33 points out:—I translate freely—

"The name *Graphoderus* was employed for the first time by Eschscholz *in litteris,* then simply cited, as a kind of synonym, without a single word of explanation by Stürm (Deutschland Fauna, p. 46) following the description of his *Hydaticus austriacus* and reproduced by Dejean (Catal. 3rd. ed., p. 61). Aubé (Spec. Col. VI, 1838, pp. 156-217) made a division of the genus *Hydaticus* of it, a division of which he indicated the general peculiarities and to which he attributed a certain number of species. It was not until much later that C. G. Thomson took the same name of which he made a genus, changed its termination and pointed out some new characters; Aubé's name is, nevertheless, absolutely valid."

Anyone interested will find the original of the above in a footnote on page 682 of the work cited.

The number of known species of the genus *Graphoderus* in North America being but five, it is rather extraordinary how little they have been understood. Dr. Sharp in his treatise on the Dytiscidae of the world (Scientific Transactions of the Royal Society of Dublin, 1882) recognized *liberus* Say, *fasciatocollis* Harris and described two more *perplexus* and *elatus,* as coming from North America. Dr. George Horn in the Transactions of the American Entomological Society, X, 1883, promptly changed this by placing *fasciatocollis* Harr., *perplexus* Sharp and *elatus* Sharp all as synonyms of the European *cinereus* Linn. To make some amends for this he described a species as *occidentalis.* Dr. Alois Zimmermann was even more drastic. In his "Die Schwimmkäfer des Deutsches Entomologische Museum in Berlin-Dahlem", he sinks *occidentalis* Horn as a synonym of *austriacus* Stürm, makes *perplexus* and *elatus* synonyms of *zonatus* Hoppe but retains *fasciatocollis* as a synonym of *cinereus,* thus crediting our fauna with three European species, *austriacus, zonatus* and *cinereus* and but one true American species, *liberus.* Dr. M. H. Hatch in his "Studies on the Dytiscidae, *Graphoderes",* Bulletin Brooklyn Entomological Society, Vol. XXIII, No. 5, restores *occidentalis* Horn but otherwise follows Zimmermann.

Dr. Horn's synonymy for *perplexus* and *elatus* may at once be disregarded as the pronotal colouration in *cinereus* is quite different from that given by Sharp for his species. In *cinereus* the anterior black pronotal band attains the front margin and the posterior black band reaches the hind margin of the pronotum. In Sharp's species, the description calls for the separation of the black bands from the margins by reddish-yellow bands. *Zonatus Hoppe,* however, has the same colouration as Sharp's species, nor can the number of palettes on the ♂ tarsi be relied upon for separation, though usually in *zonatus* the number is greater. Sharp himself differentiates both *perplexus* and *elatus* from *zonatus* by (1) the epipleurae of his species being broader and (2) by his species being more narrowed in front. Even casual comparison shows that the epipleurae are as Sharp states, and a careful measurement at the base of the abdominal segments shows that in *perplexus* the epipleura at that point is fully 20% wider than in *zonatus.* When a series of Sharp's species is compared with a series of *zonatus,* Sharp's second differentiation is also seen to be true, for quite evidently *per-*

plexus is narrower in front with its greatest width behind the middle. Unfortunately these characters can be properly appreciated only if both species are in hand.

A character that can be used with considerable confidence, implied by Dr. Sharp, though strangely enough, not definitely pointed out, is the difference in proportionate length and width. He gives 8 1/8 mm, 14 mm. for his two species and 7 3/4 mm., 14 mm. for *zonatus*. In a series of nearly two hundred *perplexus-elatus* and a series of nearly thirty European *zonatus* the proportions given above are remarkably constant. The very narrowest and most nearly parallel of *perplexus-elatus* series when placed among the *zonatus* could be instantly detected as could a *zonatus* when put among the local specimens.

An examination of the male genitalia appears to offer definite confirmation. Enclosing the genitalia is a chitinous ring, piceous in colour, bifurcate, and somewhat expanded externally. The shape of the bifurcation is markedly different in each species. This difference is difficult to put into words though immediately appreciable when seen either in the real objects or in a drawing of them. There is no doubt in my mind that Sharp's species are not *zonatus*.

Sharp relied upon the number of palettes on the ♂ tarsi to separate *perplexus* and *elatus;* 28 on the fore and 14 on the middle in *perplexus* type; 32 on the fore and 15 on the middle in *elatus* type. With over a hundred males before me I am convinced that the two species cannot be retained. While most specimens with 28-29 palettes on their fore-tarsi have 14 on the middle, and most specimens with 32 palettes on the fore have 15 on the middle tarsi, it is not unusual to find specimens having 28 palettes on the fore-tarsi and 15 on the middle and others with 32 on the fore-tarsi but 14 on the middle. Quite rarely the middle tarsi have one to several supernumerary disks, but usually these are smaller than the usual ones and quite irregularly placed. No constant differences having been found, it may, I think, be safely assumed that *perplexus* and *elatus* are the same species with *perplexus* having page priority.

In regard to *fasciatocollis* Harr., as already pointed out, Horn, Zimmermann, and Hatch all consider it to be a synonym of *cinereus* L. While the two species are certainly closely allied, I feel sure that Dr. Sharp was correct in retaining them as distinct. The differences as given by Dr. Sharp are: *fasciatocollis* is "A little narrower in front, and the anterior border of the hind coxae is not quite so approximate to the middle coxae cavity; the male has less numerous palettes on the front and middle tarsi, and the peculiar sexual punctures of the female are quite wanting in *D. cinereus*." The two former of these differences are a little difficult to use, as while true, there is some variation in the insects which makes it necessary to have series of each in hand to be able to appreciate them. The two latter differences seem to hold absolutely, although there is not always the same number of palettes on the tarsi. I have not, however, seen a *fasciatocollis* with fourteen palettes on the middle tarsi, nor with more than twenty-four small ones on the fore tarsi. Judging from a good series of *cinereus,* Dr. Sharp's statement, that the anterior black pronotal band always reaches the front margin, is true. It is by no means the case in *fasciatocollis,* however, as in quite 20% of that species there is a more or less definite, narrow reddish band between the black band and the anterior margin. The male genitalia of *cinereus* and of *fasciatocollis* show decided differences readily appreciable by sight though difficult to put into words.

A rather striking character which I believe has not hitherto been pointed out is the relative lengths of the hind femora and tibiae. In *cinereus* the femur reaches the posterior margin of the 5th abdominal segment, and the tibia projects a little past the end of the last segment, while in *fasciatocollis* the femora and tibiae are evidently shorter, the femur not reaching the posterior margin of the 5th abdominal segment and the tibia not quite reaching the end of the body.

The synonymy of the species discussed above should be, then:—

Graphoderus fasciatocollis Harris.
Graphoderus cinereus Horn nec. Linn.
Graphoderus cinereus Zimm. nec. Linn.
Graphoderus cinereus Hatch nec. Linn.
Graphoderus perplexus Sharp.
Graphoderus elatus Sharp.
Graphoderus cinereus Horn nec. Linn.
Graphoderus zonatus Zimm. nec. Hoppe.
Graphoderus zonatus Hatch nec. Hoppe.

The following key may help in placing our species. The description of *G. manitobensis* Wallis and a table comparing that species and *fasciatocollis* with the European *cinereus* may be found on pages 276–278 of The Canadian Entomologist for December, 1933.

KEY TO N. A. SPECIES OF GRAPHODERUS AUBE

1. Head and pronotum without any distinct black markings.....*liberus* Say.
   Head and pronotum with distinct black markings 2
2. Posterior pronotal black band not reaching hind margin though sometimes separated from it only by an indefinite reddish line. Male fore-tarsi with 28–32 smaller and 3 larger palettes. Male middle tarsi with 14–15 palettes. Anterior pronotal band not reaching either front or side margins .....*perplexus* Shp.
   Posterior pronotal black band always reaching hind margin 3
3. Midtarsi of ♂ not dilated. Fore-tarsi of ♂ with only 15 palettes. Size smaller, rarely attaining 13.5 mm. Pronotal black bands always attaining both fore and hind margins .....*occidentalis* Horn
   Midtarsi of ♂ dilated. Fore-tarsi of ♂ with more than 15 palettes. Size rarely as little as 13.5 mm. 4
4. Midtarsi of ♂ with 12 palettes in two rows. Fore-tarsi of ♂ with about 23 smaller and with 3 larger palettes. Anterior pronotal black band attaining front margin in about 80% of the specimens. Posterior black band always reaching hind margin. ♀ with deep fine elytral punctures baso-laterally .....*fasciatocollis* Harr.
   Midtarsi of ♂ with 28 palettes in four rows. Fore-tarsi of ♂ with 29 smaller and 3 larger palettes. Anterior pronotal black band reaching front but not side margins. Posterior band reaching both hind and side margins narrow at ends. Female unknown....*manitobensis* Wallis.

A REVISION OF THE GENUS CAMPTOPROSOPELLA HENDEL (DIPTERA, LAUXANIIDAE) *

BY G. E. SHEWELL,
Ottawa, Ont.

INTRODUCTION

This paper has already received a partial introduction in a previous publication (Canadian Entomologist, LXX, 102) in which it was stated that a revision of this genus was contemplated in order to determine the status of two Eastern Canadian species. It only remains, therefore, to acknowledge the help that has been given me by the loan of specimens and in other ways, and to make a few remarks about the characters that have been utilized in the key and descriptions.

For the loan of much material (225 specimens), on which most of the new species are based, I am particularly indebted to the United States National Museum. Also to the American Museum of Natural History (44 specimens); Professor E. H. Strickland, University of Alberta (82 specimens, Rev.

*Contribution from the Division of Entomology (Systematic Entomology) Department of Agriculture, Ottawa.

Jos. Ouellet, C. S. V. of Montreal and Professor Gustave Chagnon, Université de Montreal. The addition of the 300 odd specimens in the Canadian National Collection has brought the total of available specimens to well over 600, by far the largest collection ever assembled in the genus.

I also wish to thank Mr. David G. Hall for examining the type of *C. vulgaris* Fitch, Dr. C. H. Curran for a gift of two paratypes of *C. diversa* Curran, and especially Dr. C. E. Atwood of this Division for his help in comparing specimens with type material in Washington, making notes on several of Malloch's species, and obtaining the description of *C. nigra* Malloch, which was not available to me.

Since only three species of *Camptoprosopella* have been described from localities outside the Americas, it seemed a pity not to investigate these species, for the sake of completeness, and include them in this revision if possible. Apparently none of them may be correctly assigned to the genus and they have therefore been included, with a few notes, in the list of unrecognized species at the end of the descriptions.

In addition to the types and paratypes of *Camptoprosopella borealis* and *C. confusa* n. spp., paratypes of the following species are deposited in the Canadian National Collection at Ottawa: *decolor, gracilis, imitatrix, inaequalis, longisetosa, media, setipalpis, texana* and *varia* n. spp.

CHARACTERS

Although I am satisfied that, in the majority of cases, the characters I have used in the key may be relied upon, there are a number of species of which I have seen only one or two specimens, and it is possible that the descriptions of these will require modification as more material comes to hand. However, I have been so impressed with the constancy of such characters as the coloring of the antennae and palpi, the extent and general shape of the ocellar spot, and especially the strength of the anterior pair of dorsocentral bristles, that I feel fairly certain that none of the descriptions will require a great deal of alteration. In cases of doubt, the ultimate criteria will be the male genital structures, and it will be seen from the illustrations that these provide a very excellent basis for separating the species in this group.

The frontal triangle is herein understood to be the area delimited by the ocelli. The measurement of the body includes the antennae (to the tip of the third segment). The width or length of a structure, whenever referred to, always means its greatest width or length. In the case of the third antennal segment, the greatest width appears to be just behind the base of the arista, and the greatest length along the central line.

The descriptions, excepting the details of the male genitalia, apply to both sexes.

CAMPTOPROSOPELLA Hendel

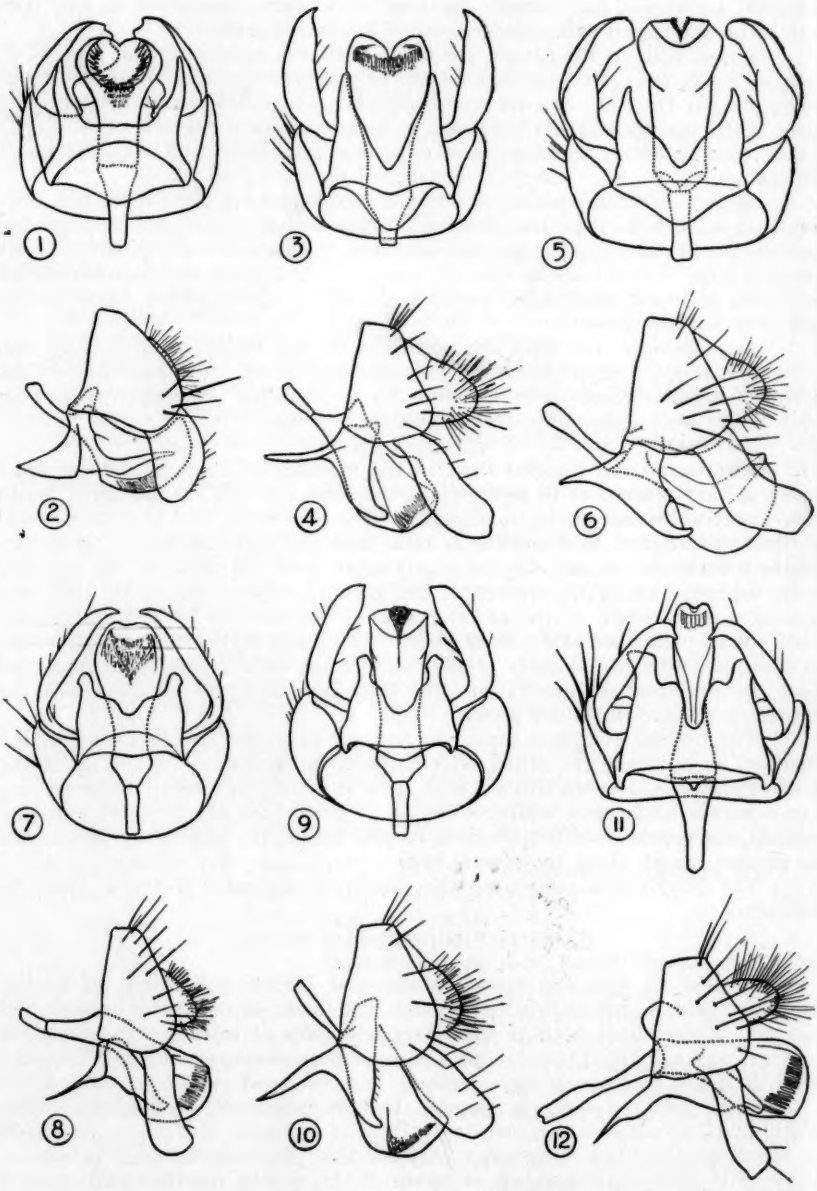
1907, *Camptoprosopella* Hendel, Wien. Ent. Zeit. 26; 223.

Related to both *Physegenua* Macq. and *Pachycerina* Macq. in having the upper pair of frontal bristles reclinate, the lower pair pointing inward and forward. Differs from both in that these two pairs of bristles arise very close together. and the facial grooves are convergent on the upper half of the face, which is almost flat, not strongly convex.

Small flies, 3-5 mms. in length. Usually pale orange-yellow, sometimes mostly black or with fuscous markings. Tips of antennae and palpi and a spot on vertex usually black, sometimes antennae and palpi wholly black or yellow. Rarely with other dark markings on head. Wings a little less than body length, pale yellowish hyaline, rarely maculated or heavily infuscated.

Head wider than high. Front about half head width, almost flat to noticeably convex, more or less sloping. Fronto-facial angle 85°—180°. Face slightly convex, vertical to moderately retreating. Facial grooves slightly convergent

PLATE 19



Hypopygia of *Camptoprosopella,* ventral and lateral view: Figs. 1, 2, *inaequalis* n. sp.; 3, 4, *slossonae* n. sp., 5, 6, *angulata* n. sp.; 7, 8, *setipalpis* n. sp.; 9, 10, *mallochi* n. sp.; 11, 12, *gracilis* n. sp.

above, moderately divergent below. Parafacials over half width of clypeus. Epistoma more or less produced. Cheeks less than a fourth to about half eye height. Palpi sometimes noticeably enlarged apically. Proboscis (protruded) about head height. Antennae erect or suberect, not more and usually less than antennal axis in length; first segment equal to or shorter than second, bare below; third segment longer than basal two together, twice to nearly four times as long as wide, more or less tapering, with rounded (rarely pointed) tip. Arista longer than third segment, long plumose above short plumose below. Two pairs of frontal bristles as above. Two pairs of verticals, inner pair twice as long as outer. Ocellars strong, directed forward, moderately divergent. Postocellars rather short, cruciate at tips.

Thorax fairly robust, mesonotum moderately arched. Scutellum normal, disc convex, rarely flattened. Chaetotaxy: 1 humeral; 2 notopleural; 1 presutural; 1 supraalar (prealar); 2 postalar; 2-3 postsutural dorsocentral; 1 prescutellar acrostical (absent in 1 sp.); 1 mesopleural; 1 sternopleural; 1 small propleural; 1 lateral scutellar; 1 apical scutellar (cruciate or not).

Abdomen short ovate, more or less tapering, wider than high, convex above. Each tergite with 3-4 irregular rows of hairs and 14-20 marginal bristles, latter variable in length but usually not more than half length of tergite, except laterally. Ovipositor short telescopic. Hypopygium small, entirely ventral.

Wing venation normal. Costal setulae ending between second and third veins. Ultimate section of fourth vein one-fifth to two and a half times longer than penultimate section.

Legs short, moderately robust. Preapical dorsal bristles on all tibiae. Middle tibia with a strong apical ventral bristle.

Genotype: *Pachycerina dolorosa* Williston.

KEY TO THE SPECIES OF CAMPTOPROSOPELLA

1. With three well-defined pairs of dorsocentral bristles, anterior pair often less than half as long as second pair 7
   With only two well-defined pairs of dorsocentral bristles, anterior pair absent or barely differentiated from surrounding hairs 2
2. Thorax and abdomen black; head yellow; third antennal segment entirely or mostly black or fuscous 3
   Thorax yellow; third antennal segment entirely yellow or black only towards tip 4
3. A large fuscous spot on centre of face; legs almost entirely black (Argentine) ..... (1) *nigra* Mall.
   No such spot on face; legs largely tawny yellow (Costa Rica). ..... (2) *atra* Mall.
4. Abdomen shining black or fuscous, contrasting with yellow of thorax (Peru) ..... (3) *xanthoptera* Hend.
   Thorax and abdomen unicolorous 5
5. Abdomen with a large black spot on each side of third and another on fourth tergite; prescutellar acrostical bristles absent (Costa Rica) ..... (4) *latipunctata* Mall.
   Abdomen without black spots; prescutellar acrostical bristles present 6
6. Ventral plate of hypopygium apparently linear centrally, its processes almost straight; phallus subcylindrical in ventral view (Figs. 21, 22. Cuba) ..... (5) *cubana* n. sp.
   Ventral plate of hypopygium not linear centrally, its processes in lateral view abruptly bent back at right angles in middle; phallus distinctly constricted at middle in ventral view (Figs. 25, 26. Florida, Porto Rico) ..... (6) *diversa* Curr.

(I cannot distinguish between females of *diversa* Curr. and *cubana* n. sp.)

7. (1) Palpi entirely yellow 8
Palpi at least slightly blackened at tips 9
8. Wings maculated (Arizona) ..... (7) *maculipennis* Mall.
Wings not maculated (Costa Rica) ..... (8) *flavipalpis* Mall.
9. Wings almost entirely deep fuscous; brown spots between antennal bases and eyes; abdomen deep fuscous (Southwestern U. S., Mexico) ..... (29) *dolorosa* Will.
Wings hyaline or pale yellowish, at most moderately infumated on the costal border; no spots between antennal bases and eyes 10
10. Palpi suddenly widened apically, three or four times as wide near tips as near bases 11
Palpi of normal shape, gradually widened from their bases, not more than twice as wide near tips as near bases 14
11. Thorax with more or less distinct reddish brown stripes, if not, then arista not very bushy, i. e., not with more than about ten or twelve long dorsal hairs on basal half, these hairs clearly much longer than the short hairs between them 12
Thorax uniformly yellow, without stripes; arista very bushy, i. e., with very numerous long decumbent dorsal hairs on basal half, most of them being short hairs developed to almost equal length with the long hairs, the latter however still discernable as a regular series; tip of third antennal segment pointed (S. Dakota) ..... (26) *acuticornis* n. sp.
12. Anterior dorsocentrals over three fourths length of second pair; arista very bushy (see couplet 11, section 2); front evenly sloping, nearly flat in profile; face retreating 13
Anterior dorsocentrals not much more than half length of second pair; arista not very bushy (see couplet 11, section 1); front horizontal at least near vertex, convex or subangulate in profile; face vertical (Mexico) ..... (25) *media* n. sp.
13. Infuscation of vertex extending back onto occiput between postocellars, usually large, diamond-shaped, over twice as long as triangle (Florida, Georgia) ..... (28) *verticalis* Loew
Infuscation of vertex not extending back as far as postocellars, usually not behind ocelli, small, ovate or circular, not twice as long as triangle (Texas) ..... (27) *texana* n. sp.
14. (10) Long dorsal hairs of arista decumbent, short hairs rather numerous and about half as long as the long hairs; reddish-brown strips on mesonotum or at least a reddish stain along notopleural suture 15
Long dorsal hairs of arista suberect basally, short hairs sparse and very short; no stripes on mesonotum 16
15. Infuscation of third antennal segment very faint; superior forceps of hypopygium rather elongate with rounded tips; tip of phallus in ventral view not much enlarged (Figs. 31, 32, Tennessee, Texas) .... (24) *decolor* n. sp.
Infuscation of third antennal segment heavy on apical fourth of inner side and to near base below on outer side; superior forceps of hypopygium short and broad, tips truncate and unevenly serrate; tip of phallus greatly enlarged, with strong rim of stylets (Figs. 1, 2. Widespread in U. S.) ..... (23) *inaequalis* n. sp.
16. Anterior dorsocentrals more than half length of second pair 17
Anterior dorsocentrals half or less than half length of second pair 25
17. Wing veins yellow, membrane tinged with yellow. Nearctic species. (If Neotropical, then large species 3.5-4 mms. with anterior dorsocentrals hardly more than half length of second pair, usually less) 18
Wing veins brown, membrane hyaline or more or less pale brown-tinged. Neotropical species 23

18. Anterior dorsocentrals about two-thirds length of second pair or more.....19
Anterior dorsocentrals about half length of second pair.....22

19. Palpi with not more than five or six long black hairs on their ventral sides 20
Palpi with ten to twelve long black hairs on their ventral sides (D. C., Virginia) .....(17) *setipalpis* n. sp.

20. Superior forceps of hypopygium about three times length of its second segment, thin and rod-like on basal three-fourths, abruptly widened at apex into flattened lobes (Can. Ent. 70: 136. Figs. 49, 50. Widespread in Canada and U. S.) .....(15) *borealis* n. sp.
Superior forceps not as above.....21

21. Superior forceps conspicuously bent at middle in lateral view, about three times as long as wide, tips broadly rounded (Figs. 5, 6. Maryland) .....(20) *angulata* n. sp.
Superior forceps not angulate at middle, about twice as long as wide, tips sharply pointed (Can. Ent. 70: 136. Figs. 47, 48. Eastern Canada and U. S.) .....(22) *confusa* n. sp.
(I cannot distinguish between females of *borealis, confusa,* and *angulata* n. spp.)

22. (18) Superior forceps three times as long as wide, longer than second hypopygial segment; processes of ventral plate broad at base (Figs. 3, 4. Eastern U. S.) .....(19) *slossonae* n. sp.
Superior forceps not twice as long as wide, shorter than second hypopygial segment; processes of ventral plate narrow at base (Figs. 23, 24. Mexico, Guatemala) .....(21) *imitatrix* n. sp.

23. (17) Cheeks less than a fourth eye height; hypopygium elongate; processes of ventral plate very long, broad, undulate with tips pointing outward (Figs. 27, 28. Guatemala) .....(10) *hera* n. sp.
Cheeks about a third eye height or a little less; hypopygium not as above....24

24. Bristles on second hypopygial segment unusually long and strong, sinuate; processes of ventral plate long and slender (Figs. 33, 34. Ecuador) .....(13) *longisetosa* n. sp.
Bristles on second hypopygial segment normal; processes of ventral plate hardly developed, represented by short blunt tubercles (Figs. 29, 30. Guatemala) .....(14) *cruda* n. sp.

25. (16) Inner side of third antennal segment heavily infuscated on apical fifth or less 34
Inner side of third antennal segment heavily infuscated on apical third or more 26

26. Wing veins yellow, membrane with yellowish tinge, not infumated. Large species, 4-4.5 mms. 27
Wing veins brown, membrane sometimes more or less infumated especially on costal half. Small southern species, usually not more than 3.5 mms. 30

27. Superior forceps of hypopygium broad, not twice as long as wide; processes of ventral plate slender to their bases (Figs. 23, 24. Mexico, Guatemala) .....(21) *imitatrix* n. sp.
Superior forceps more slender, at least twice as long as wide; processes of ventral plate broad at their bases. Eastern species.....28

28. Processes of ventral plate evenly tapering from broad bases to narrowly rounded tips (Figs. 3, 4. Eastern U. S.) .....(19) *slossonae* n. sp.
Processes of ventral plate with broad basal parts abruptly constricted distally to short blunt lobes 29

29. Superior forceps very slender, nearly four times as long as wide; phallus laterally compressed, in ventral view over four times as long as wide

(Figs. 11, 12. D. C., Maryland, Virginia) ..... (16) *gracilis* n. sp.
Superior forceps broader, twice as long as wide; phallus not laterally compressed (Figs. 9, 10. Maryland, Virginia) ..... (18) *mallochi* n. sp.
(I cannot distinguish between females of *slossonae, gracilis,* and *mallochi* n. spp.)

30. (26) Infuscation of vertex not more than one and a half times length of triangle; wing membrane not at all or only faintly infumated.....31
Infuscation of vertex very large, two or three times length of triangle, pointed in front; wing membrane often heavily infumated on costal half. (Costa Rica, Guatemala, Mexico) ..... (12) *varia* n. sp.

31. Infuscation of vertex confined to triangle.....32
Infuscation of vertex not confined to triangle 33

32. Ventral plate of hypopygium apparently linear centrally, its processes almost straight; phallus subcylindrical in ventral view (Figs. 21, 22. Cuba) ..... (5) *cubana* n. sp.
Ventral plate of hypopygium not linear centrally, its processes in lateral view abruptly bent at right angles at their middle; middle of phallus constricted in ventral view (Figs. 25, 26. Florida, Porto Rico) ..... (6) *diversa* Curr.

33. Eyes unusually large; cheeks less than a fourth eye height (Guatemala)) ..... (10) *hera* n. sp.
Eyes normal; cheeks about a third eye height (Guatemala) .. (14) *cruda* n. sp.

34. (25) Wing veins brown; infuscation of third antennal segment very pale except at extreme tip (Costa Rica) ..... (9) *pallidicornis* n. sp.
Wing veins yellow; infuscation of third antennal segment heavier (Brazil) ..... (11) *equatorialis* n. sp.

1. **Camptoprosopella nigra** Malloch

1933, *Camptoprosopella nigra* Malloch, Dipt. Patagonia and S. Chile, Pt. VI, Fasc. 4, p. 357. Brit. Mus. (Nat. Hist.).

Head shining testaceous-yellow, a fuscous mark on each side of upper occiput, a black spot over ocelli and a large fuscous spot covering nearly all centre of face. Front rather abruptly declivitous just in front of anterior frontal bristle. Antennae fuscous, brownish-yellow at tip of second and base of third segment, latter broadly rounded at tip, about twice as long as wide; arista long plumose above, short haired below. Palpi black. Thorax glossy black, mesonotum slightly brownish-dusted, two pairs postsutural dorsocentrals, prescutellar acrosticals very short, acrostical hairs in four irregular series. Legs black, tips of femora and bases of tibiae yellowish. Wings brownish hyaline, veins pale. Halteres yellow. Length 3.5 mms.

Type—♀, Bompland, Misiones, Argentina. (In Brit. Mus.).

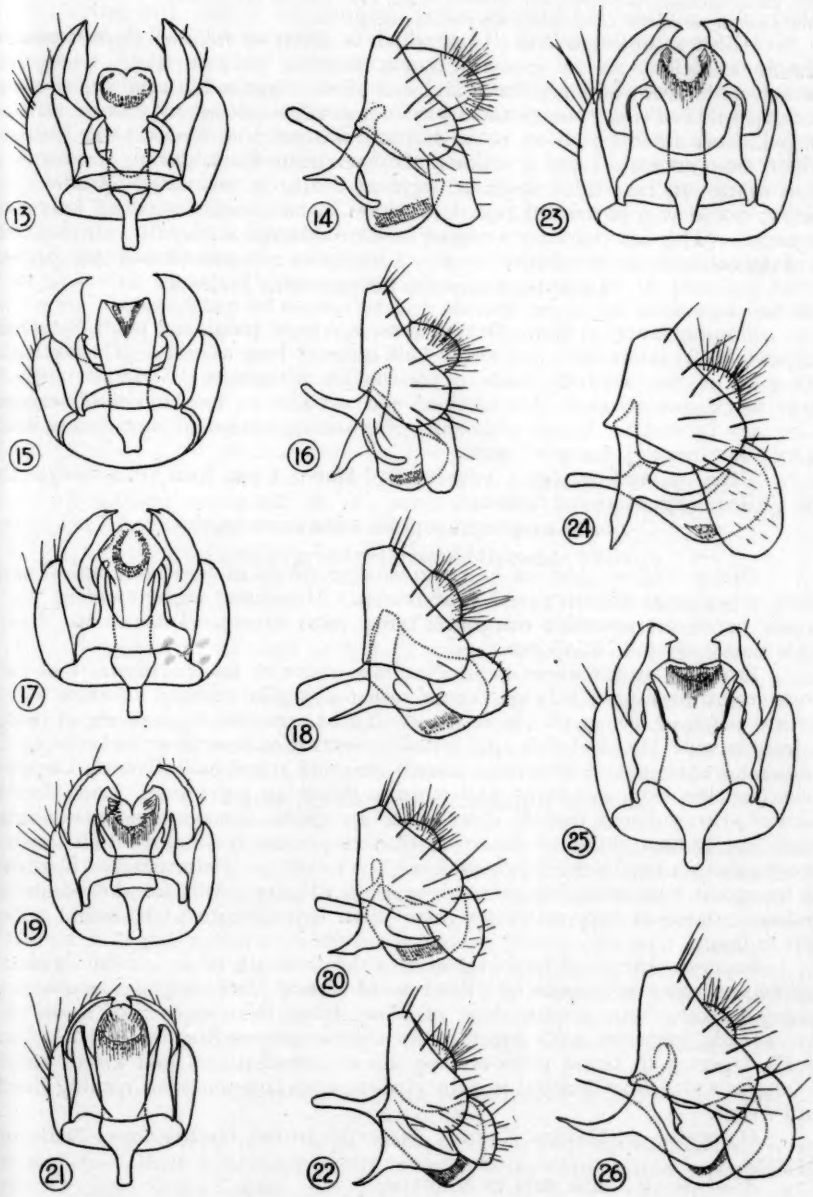
2. **Camptoprosopella atra** Malloch

1926. *Camptoprosopella atra* Malloch, Proc. U. S. N. M., 68, Art. 21, p. 6.

Head yellow, ocellar spot and third antennal segment black, latter not much tapered apically, about twice as long as wide. Arista moderately densely plumose. Palpi fuscous. Thorax shining black, two pairs of long dorsocentrals and a barely differentiated pair of fine hairs in place of anterior pair, prescutellar acrosticals small. Abdomen shining black. Legs tawny yellow, coxae, mid and hind femora almost entirely blackened, fore femora less so. Wings slightly brownish, last section of fourth vein twice as long as preceding section. Halteres fuscous. Length 2.25 mms.

Types—♂, ♀, Higuito, San Mateo, Costa Rica (P. Schild). In the United States National Museum. (Original description supplemented with notes made by Mr. Atwood.)

PLATE 20



Hypopygia of *Camptoprosopella*, ventral and lateral views: Figs. 13, 14, *texana* n. sp.; 15, 16, *verticalis* Loew; 17, 18, *varia* n. sp.; 19, 20, *media* n. sp.; 21, 22, *cubana* n. sp.; 23, 24, *imitatrix* n. sp.; 25, 26, *diversa* Curran.

3. **Camptoprosopella xanthoptera** Hendel

1907. *Camptoprosopella xanthoptera* Hendel, Wien. Ent. Ztit. 26:224 (Peru).
1914. *Camptoprosopella xanthoptera* Kertesz, Psyche, 21: 82.

Allied to *dolorosa* Will., from which it differs as follows: clypeus not so prominent below, almost straight; thorax uniform reddish-yellow; triangular dark spots between antennal bases and eyes absent; legs reddish-yellow, all tarsi and tips of fore tibiae somewhat dusky; wings veins yellow, membrane yellow-tinged, more intensely so on costal border; two pairs of dorsocentral bristles. Differs from *verticalis* Loew as follows: abdomen quite black, shining, contrasting with orange thorax; third antennal segment distinctly infuscated apically and below; dorsal rays of arista longer in relation to basal width of third antennal segment. (This last character seems to indicate that the arista of *C. xanthoptera* is of the commonest "non-bushy" type.) I have seen no specimens of this species.

4. **Camptoprosopella latipunctata** Malloch

1926 *Camptoprosopella latipunctata* Malloch, Proc. U. S. N. M. 68, art. 21, p. 6.

Shining tawny yellow. Ocellar spot, apices of palpi and third antennal segment black, latter fully two and a half times as long as wide. Thorax with two pairs of dorsocentrals, without prescutellar acrosticals. Abdomen with a large black spot on each side of third and another on fourth visible tergite. Fore tarsi brownish. Wings yellowish, penultimate section of fourth vein half as long as ultimate. Length 3 mms.

Type– ♀, and paratypes, Higuito, San Mateo, Costa Rica (P. Schild). In the United States National Museum.

5. **Camptoprosopella cubana** n. sp.

(Figs. 21, 22.)

Orange yellow. Apical four segments to whole of fore tarsi, apical two or three segments of other tarsi light brown. Abdominal segments often with brown bands on posterior margins. Wing veins brown. Dimensions: Body 3-3.5 mms. Wing 2.75-3.25 mms.

Front in profile about as long as face, more or less horizontal and flat from vertex to frontal bristles, thence rather abruptly curving down to meet vertical plane of face at an obtuse angle. Third antennal segment about twice as long as wide (1/1.9–1/2.1), tip broadly rounded or sometimes rather square, infuscation subequal on both sides, usually covering apical half above and below, sometimes less extensive above and more so below on outer side. Long dorsal hairs of arista suberect basally, short hairs very sparse, two or three outstanding below on median third. Infuscation of vertex entirely confined to triangle. Cheeks about a fourth eye height or less (1/4.3–1/3.7). Palpi narrow, blackened on apical half, with five or six long ventral hairs. Anterior dorsocentrals undifferentiated or very small, not more than twice length of acrostical hairs next to them.

Superior forceps of hypopygium two thirds length of its second segment, leaf-shaped, tips acutely pointed. Processes of ventral plate long, almost straight, arising directly from extreme base of plate, latter thus apparently linear on ventral side, processes with broad bases almost surrounding base of phallus, evenly tapering to broad point-bearing apices. Phallus two and a half times as long as wide, subcylindrical in ventral view, with large circular opening lined with stylets.

Holotype– ♂, Havana, Cuba. (Baker). In the United States National Museum.

Allotype– ♀, same data as holotype.

Paratype– ♂, same data as types.

6. **Camptoprosopella diversa** Curran

(Figs. 25, 26.)

1926 *Camptoprosopella diversa* Curran, Amer. Mus. Novit. 220. p. 13.

Orange yellow. Apical one or two segments of tarsi light brown. Poster-

ior edges of abdominal segments often banded with brown. Wing veins brown. Dimensions: Body 3-4 mms. Wing 3 mms.

Front in profile as long as face, very convex, evenly sloping from vertex into plane of face, not forming an angle with it at base of antennae. Face retreating. Third antennal segment about half as wide as long, apex broadly rounded, infuscation subequal on both sides, covering apical third above and two thirds below. Long dorsal hairs of arista suberect basally, short hairs sparse, two or three outstanding hairs on median third below. Infuscation of vertex confined to triangle, sometimes a little produced behind towards postocellar bristles. Cheeks about a third eye height (1/3.6—1/3.0). Palpi narrow, infuscated on apical third to half, with six long ventral hairs. Anterior dorsocentrals about two fifths length of second pair.

Superior forceps of hypopygium very similar to those of *imitatrix* n. sp. but somewhat shorter. Ventral plate large, in ventral view its processes rather abruptly narrowed beyond broad bases, with numerous very short fine hairs on median edges; in lateral view processes are abruptly bent backward at right angles in the middle, basal portion twice as broad as apical portion. Phallus in ventral view three fifths as wide as long, almost as wide at base as at tip, somewhat constricted in middle, angulate laterally near tip, opening large, stylets moderately prominent.

Types—♂, ♀, Coamo Springs, Porto Rico. Paratypes from Porto Rico, Mona Isl. and Haiti. In the American Museum of Natural History, New York.

Specimens examined: ♂, ♀, paratypes and ♂, ♀, St. Petersburg, Fla. Aug. 6, 1913. Reared from avocado (E. R. Sasscer.)

7. **Camptoprosopella maculipennis** Malloch

1923. *Camptoprosopella maculipennis* Malloch, Proc. Ent. Soc. Wash. 25:47.

Honey yellow, shining. Ocellar spot and apex of third antennal segment black, latter not much tapered apically, about two and a half times as long as wide. Palpi yellow. Thorax with three pairs of dorsocentrals. Abdomen largely suffused with fuscous. Costal margin of wing to beyond apex of first vein, and the crossveins broadly brown, last section of fourth vein about 2.5 as long as preceding section. Calyptrae and halteres yellowish. Length 2.5 mms.

Type—♀, Stone Cabin Canyon, Santa Rita Mts., Arizona. In the United States National Museum. (The only known species with maculated wings.)

8. **Camptoprosopella flavipalpis** Malloch

1926. *Camptoprosopella flavipalpis* Malloch, Proc. U. S. N. M. 68, Art. 21, p. 7.

Mr. Atwood has compared the type series of *flavipalpis* Malloch with that of *pallidicornis* n. sp. and finds them distinct in the following characters. The third antennal segment in *flavipalpis* is heavily infuscated on about the apical third, the darkened area terminating rather abruptly on the outer side. The palpi in *pallidicornis* are distinctly though faintly darkened apically. The vertical infuscation is smaller and more nearly circular in *flavipalpis* and the penultimate section of the fourth vein is longer in comparison with the ultimate section. (Fully 4/5ths in *flavipalpis*, little more than 3/5ths in *pallidicornis*.)

Type—♀, and paratypes, San Mateo, Costa Rica (P. Schild). In the United States National Museum.

9. **Camptoprosopella pallidicornis** n. sp.

(Figs. 37, 38.)

Orange yellow. Fore tarsi, apical three or four segments of other tarsi brown, fore tibiae sometimes faintly brown. Wing veins brown. Dimensions: Body 3 mms. Wing 3 mms.

Front rather short, in profile convex, merging into plane of face, not forming an angle with it at antennal base. Face vertical. Third antennal segment about twice as long as wide (1/1.8—1/2.0), tip broadly rounded, infuscation confined to apical fourth and very light, only extreme tip rather dark brown.

Long dorsal hairs of arista suberect basally, short hairs very sparse, several rather long outstanding hairs on median third below. Infuscation of vertex small, circular or oval, very little longer or wider than triangle. Cheeks about a third eye height (1/3.3–1/3.0). Palpi narrow, infuscated rather lightly on apical fourth to third, with five or six long ventral hairs. Anterior dorsocentrals less than half length of second pair (1/2.5–1/2.2).

Superior forceps of hypopygium about two thirds length of its second segment, evenly tapering to small blunt processes at tips in ventral view, sides subparallel on basal three fourths in lateral view. Processes of ventral plate dorsoventrally compressed, broad, almost straight, bladelike with rounded tips, shorter more pointed processes on either side of these visible in lateral view. Phallus two and a half times as long as wide, narrowest near base, gradually widened into an elongate clubshaped extremity, stylets all internal, apical ones compressed into a conical structure.

Holotype– ♂, Higuito, San Mateo, Costa Rica, (Pablo Schild. coll.) In the United States National Museum.

Allotype– ♀, same data as holotype.

Paratype– ♀, same data as types.

10. **Camptoprosopella hera** n. sp.

(Figs. 27, 28.)

Orange yellow. Tips of fore tibiae, fore tarsi, apical two or three segments of other tarsi light brown. Wing veins brown. Dimensions: Body 3 mms. Wing 2.75 mms.

Front in profile about as long as face, evenly convex, merging into vertical plane of face anteriorly. Third antennal segment less than twice as long as wide (1/1.8), as wide near tip as near base, apex broadly rounded, infuscation subequal on both sides, fairly heavy, covering apical third above and half below. Long dorsal hairs of arista suberect basally, short hairs sparse, hairs below noticeably longer and more widely spaced on apical half. Infuscation of vertex small, nearly circular, less than one and a half times length of triangle. Eyes unusually large, cheeks less than a fourth eye height (1/4.2). Anterior dorsocentrals about half length of second pair.

Hypopygium elongate. Superior forceps about equal in length to its second segment, narrow leafshaped, in ventral view about three times as long as wide, almost straight, tips sharply pointed. Ventral plate linear mesally, processes very long, broad and undulate with tips pointing outward. Phallus very long, three times as long as wide, very narrow at middle, much enlarged toward apex, opening rather large, circular, surrounded by minute stylets.

Type– ♂, Ayutla, Guatemala, April 1913. (J. M. Aldrich coll.) In the United States National Museum.

The single specimen has the tips of both the anterior dorsocentral bristles broken off, and the proboscis and palpi are also missing.

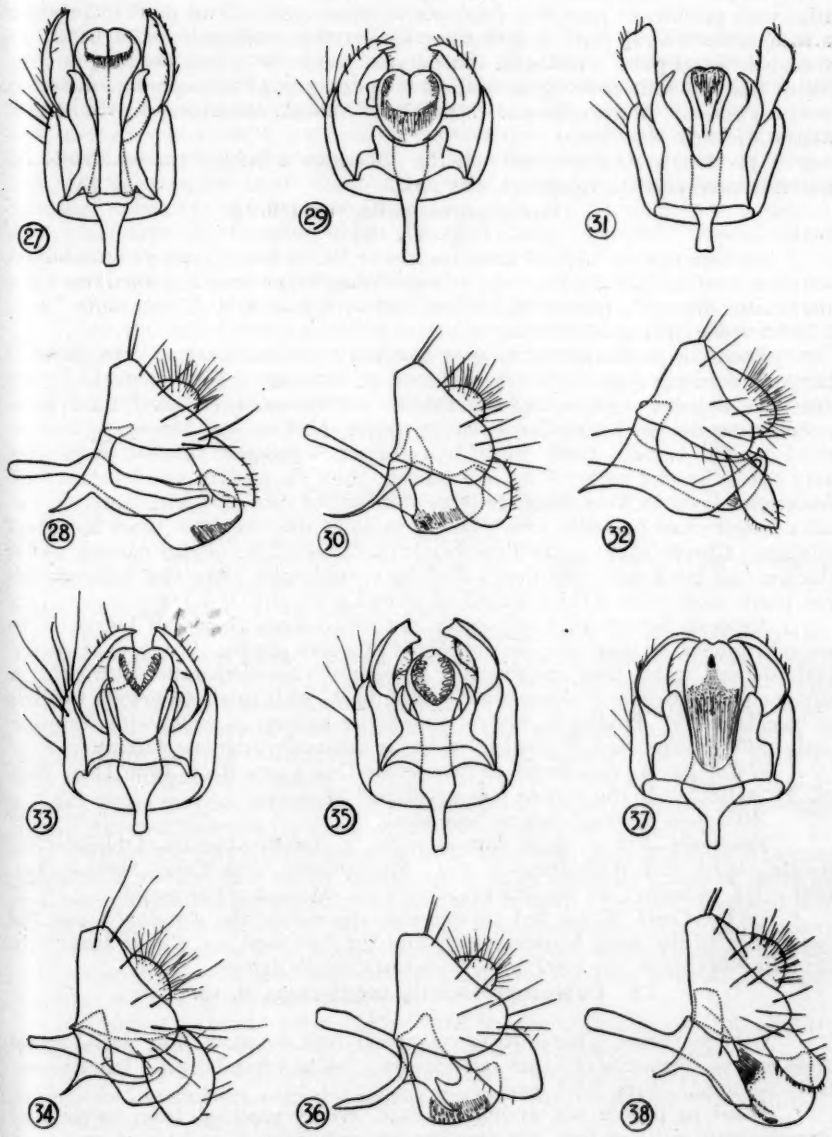
11. **Camptoprosopella equatorialis** n. sp.

(Figs. 35, 36.)

Orange yellow. Fore tarsi light brown. Wing veins yellow. Dimensions: Body 3 mms. Wing 2.75 mms.

Front in profile not quite as long as face, more or less straight from vertex to anterior frontals, thence curving sharply down into vertical plane of face. Third antennal segment twice as long as wide, tip broadly rounded, infuscation subequal on both sides, not heavy, deep brown on apical fifth, lighter brown to basal third below. Long dorsal hairs of arista suberect basally, short hairs sparse above and below, a few outstanding hairs on median third below. Infuscation of vertex small, circular, one and a half times length of triangle. Cheeks less than a third eye height (1/3.6). Palpi narrow, infuscated on apical fifth, with

PLATE 21



Hypopygia of *Camptoprosopella*, ventral and lateral views: Figs. 27, 28, *hera* n. sp.; 29, 30, *cruda* n. sp.; 31, 32, *decolor* n. sp.; 33, 34, *longisetosa* n. sp.; 35, 36, *equatorialis* n. sp.; 37, 38, *pallidicornis* n. sp.

six long ventral hairs. Anterior dorsocentrals apparently rather less than half length of second pair.

Superior forceps less than two thirds length of its second segment, leaflike, with prominent preapical processes on inner sides. Two pairs of processes arising from ventral plate, a thin curved pointed median pair and a broad flat rounded lateral pair. Phallus in ventral view about three times as long as wide, about twice as wide near tip as near base, opening large with prominent stylets.

Type—♂, Manao, Brazil. Miss H. B. Merrill, collector. In the United States National Museum.

The single specimen lacks all the dorsocentral bristles except one of the anterior ones, and the hindmost four tarsi.

12. **Camptoprosopella varia** n. sp.

(Figs. 17, 18.)

Orange yellow. Apical three fourths or less of fore tibiae, all tarsi brown, anterior tarsi usually darker than others. Wing veins brown, sometimes membrane also distinctly infumated at base and on costal half. Dimensions: Body 2.75-3.5 mms. Wing 3-3.5 mms.

Front in profile not as long as face, very convex, merging into plane of face, not forming angle with latter at base of antennae. Face vertical. Third antennal segment twice as long as wide or a little more (1/2.0—1/2.2), infuscation subequal on both sides, covering apical third to half above and half to three fourths below. Long dorsal hairs of arista suberect basally, short hairs very sparse, several rather long outstanding hairs on median third below. Infuscation of vertex very large, roughly diamond-shaped but with anterior two sides longer than posterior two, pointed in front, two to three times length of triangle. Cheeks about a third eye height (1/3.0—1/2.5). Palpi narrow, apical third to half blackened, with five or six long ventral hairs. Anterior dorsocentrals not much more than a third length of second pair (1.1/3—1.3/3).

Superior forceps of hypopygium not much more than half length of its second segment, leaflike, with small pointed processes at tips. Processes of ventral plate slender, rather long and tapering, in ventral view subparallel with extreme tips incurved, in lateral view evenly curved back, with small setigerous tubercle at base laterally. Phallus in ventral view twice as long as wide, with conspicuously differentiated apical portion which is distinctly angulate laterally.

Holotype—♂, San Pedro de Montes de Oca, Costa Rica, June 11th, 1933. (C. H. Ballou). In the United States National Museum.

Allotype—♀, same data as holotype.

Paratypes—4 ♂♂, same data as types; ♂, La Providencia, Obispo, Guatemala, April 15th (Aldrich); 2 ♂♂, Motzorongo, Vera Cruz, Mexico, Jan. 1892. (H. Osborn); ♀, San Rafael, Vera Cruz, Mexico. (Townsend.)

In the Costa Rican and Guatemalan specimens, the clouding along the costal edge of the wing is conspicuous and the fore tarsi are almost black. In the other specimens, the color is, in both cases, much lighter.

13. **Camptoprosopella longisetosa** n. sp.

(Figs. 33, 34.)

Orange yellow. Fore tibiae on apical half or more, fore tarsi, apical three or four segments of other tarsi brown. Wing veins brown. Dimensions: Body 3-4 mms. Wing 3-3.5 mms.

Front in profile not as long as face, evenly rounded from vertex and merging into plane of face, not forming an angle with it at base of antennae. Face vertical or slightly retreating. Third antennal segment about twice as long as wide (1/1.9—1/2.4), infuscation subequal on both sides, covering apical third to half above and half to two thirds below. Long dorsal hairs of arista suberect basally, short hairs sparse, several outstanding hairs below on median third. Infuscation of vertex small, circular or oval, little more than one and

a half times length of triangle. Cheeks about a third eye height or less (1/3.5—1/3.0). Palpi narrow, infuscated on apical third to half, with five to seven long ventral hairs. Anterior dorsocentrals half to two thirds length of second pair (1.6/3—2.0/3).

Hypopygium differs from all others in having hairs of its second segment very sinuate and unusually long and strong. Superior forceps about three fourths length of second segment, in ventral view somewhat spatulate, apical half of posterior edges parallel. Processes of ventral plate slender straight, slightly divergent in ventral view, incurved at extreme tips, a seta arising at base laterally but its tubercle hardly apparent. Phallus in ventral view twice as long as wide, tip bulbous, not at all angulate laterally, opening rather large with strong marginal stylets.

Holotype—♂, Ecuador 1914. (H. A. Parish). In the United States National Museum.

Allotype—♀, same data as holotype.

Paratypes—2 ♂ ♂, 2 ♀ ♀, same data as types.

(In the half-dozen specimens before me, the lateral marginal bristles of the abdomen, especially on the apical one or two segments, tend to be abnormally long and strong. This character is probably usable for this species and agrees with the normal development of the hairs on the hypopygium, but it is impossible to evaluate it accurately, as it appears to be quite variable in other species of which I have more material).

14. **Camptoprosopella cruda** n. sp.

(Figs. 29, 30.)

Orange yellow. Fore tarsi and tips of fore tibiae brown, other tarsi more or less brownish but not so dark as anterior pair. Wing veins brown. Dimensions: Body 2-3 mms. Wing 2.5-2.75 mms.

Front in profile not quite so long as face, more or less evenly convex, merging into vertical plane of face. Third antennal segment about twice as long as wide (1/1.9—1/2.3), infuscation quite heavy, subequal on both sides, covering apical fourth above and half below. Long dorsal hairs of arista suberect basally, short hairs sparse above and below, two or three outstanding hairs on median third below. Infuscation of vertex small, circular, not over one and a half times length of triangle. Cheeks about a third eye height (1/3.2-1/2.8). Palpi narrow, infuscated on apical third or fourth, with five long ventral hairs. Anterior dorsocentrals half length of second pair. (1/1.9).

Superior forceps of hypopygium little more than half length of its second segment, in ventral view rather constricted basally, abruptly enlarged on apical half, with prominent inward-pointing processes at tips. Processes of ventral plate very small, represented merely by two large blunt tubercles. Phallus in ventral view more than half as wide as long, apical portion very much enlarged and well differentiated, twice as wide and one and a half times as long as basal part, opening large with fairly prominent stylets.

Type—♂, Cacao, Trece Aguas, Alta v. Pazo, Guatemala. April 14th. (Barber and Schwarz coll.) In the United States National Museum.

Two female specimens from Chinandega, Nicaragua, (coll. Baker.) have been placed tentatively with this species as they show characters well within the possible limits of variation.

15. **Camptoprosopella borealis** n. sp.

1925. *Camptoprosopella verticalis* Malloch and McAtee, Proc. U. S. N. M. Vol. 65 art. 12. Plate 2, Fig. 17. (nec. *vertalis* Loew.)

1938. *Camptoprosopella* sp. 2. Shewell, Can. Ent. 70: 136. Plate 13, Figs. 49, 50.

Yellow. Fore tarsi except sometimes the metatarsi, apical two or three

segments of other tarsi light brown. Wing veins yellow. Dimensions: Body 3-4 mms. Wing 3-4 mms.

Front and face in profile similar to *confusa* n. sp. Third antennal segment about twice as long as wide (1/2.1—1/2.5), apex broadly rounded, infuscation subequal on both sides though usually slightly heavier and more extensive outwardly, covering apical fourth to third above and third to two thirds below; arista, with its hairs, similar to that of *confusa* n. sp. Infuscation of vertex usually ovate, about twice as long as wide, though often truncate anteriorly, rarely more than one and a half times the length of the triangle. Cheeks more than one third the eye height (1/2.75—1/2.25). Palpi narrow, infuscated on apical third to two thirds, with five to seven long hairs on ventral side. Anterior dorsocentrals about two thirds length of second pair, or more (1.9/3—2.5/3).

Superior forceps of hypopygium very long and thin, about three times as long as its second segment, never completely concealed in dried specimens, suddenly widened on apical fourth into flattened lobes. Processes of ventral plate about half length of superior forceps, slender, with enlarged tips bearing short backwardly directed processes, a rather strong seta at base of each process behind. Phallus nearly as long as superior forceps, two stylets attached to membrane at base, basal two thirds narrow, rather suddenly widening into a large bulbous tip with small narrow opening surrounded by a few prominent stylets.

Holotype— ♂, Ottawa, Ont. June 20th, 1938. Taken on Iris leaves (Shewell). In the Canadian National Collection.

Allotype— ♀, same data as type.

Paratypes—Numerous specimens from the following localities: Quebec; Ile de Montreal (Beaulieu), Boucherville, Joliette. Oka (Ouellet), Ile Jesus (Chagnon), Ft. Coulonge (Beaulne), Kazubazua (Adams), Abbotsford, L'Assomption, Norway Bay (Shewell), Ste. Anne de Bellevue. Ontario; Ottawa (Brooks, Fletcher, Curran, Shewell). Manitoba; Aweme (Bird, Handford), Treesbank (Criddle). Saskatchewan; Saskatoon (King), Estevan (Brown), Indian Head (Stewart). Alberta; Lethbridge (Seamans, Carter, Revell.), Chin (Gray), Medicine Hat (Carr, Malloch), Edmonton (Strickland, Peck.), Wetaskiwin (Morrison), Wabamun, Gull Lake, High Prairie (Strickland). British Columbia; Summerland (Gartrell), Cranbrook, Creston (Dennys). Massachusetts; near Salem, Tothill). New York; Riverhead (Huckett). Michigan; Battle Creek (Aldrich), S. Haven. Iowa; Clinton, DeWitt, Pleasant Valley (Walley). N. Dakota; Bismark (Gabrielson). S. Dakota (Aldrich). Colorado; Denver (Jackson).

Collection dates in Canada are from June 9th (Lethbridge) to October (Medicine Hat), and in the United States from June 17th (Denver, Colo.) to July 31st (Riverhead, N. Y.)

(To be concluded in July issue)

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